

PROCEEDINGS  
OF THE  
CALIFORNIA ACADEMY OF SCIENCES

Fourth Series

Vol. XXX, No. 4, pp. 81-90, pls. 8-9

August 31, 1961



FOUR SPECIES OF CHITONS FROM  
THE PANAMIC PROVINCE  
(MOLLUSCA: POLYPLACOPHORA)

By

Allyn G. Smith

*Associate Curator, Department of Invertebrate Zoology  
California Academy of Sciences*

In working with the chiton fauna of the Panamic Province the problem arose of identifying three species from the Gulf of California and one from Panama collected by Herbert N. Lowe and listed subsequently in a paper by Pilsbry and Lowe (1932). These are:

*Nuttallina mexicana* Pilsbry, from Guaymas

*Chaetopleura raripustulosa* Pilsbry, from Guaymas

*Ischnochiton lowei* Pilsbry, from Manzanillo

*Acanthochitona panamensis* Pilsbry, from Panama and south

Correspondence with Dr. Pilsbry prior to his death revealed the fact that the manuscript describing these species had not been published and could not be found. Recently, Drs. R. Tucker Abbott and Robert Robertson, and Miss Virginia Orr of the Academy of Natural Sciences at Philadelphia, kindly looked up original material relating to these four species and in the process discovered Pilsbry's notes on three of them. The specimens involved, together with the notes, were loaned for study. In order to complete the picture, Lowe's so-called paratypes and other pertinent specimens from the Lowe Collection at the San Diego Society of Natural History were loaned through the courtesy of Emery P. Chace, Curator. As a result there is now before me all of the known material needed to determine the status of the above four species, which can only be considered as *nomina nuda*, and which should be redefined.

It now appears that two of Pilsbry's species, *Nuttallina mexicana* and *Chaetopleura raripustulosa*, have subsequently been named and described by Dr. S. S. Berry, the former not figured. The remaining two species, *Ischnochiton lowei* and *Aathochiton panamensis*, are new and descriptions and figures of them are published here for the first time.

*Nuttallina crossota* Berry.

(Plate 8, figure 1.)

*Nuttallina mexicana* Pilsbry, PILSBRY and LOWE, 1932, Proc. Acad. Nat. Sci. Philadelphia, vol. 84, p. 129. [A nomen nudum.] STEINBECK and RICKETTS, Sea of Cortez, 1941, p. 549.

*N. crossota* BERRY, 1956, Leaflets in Malacology, vol. 1, no. 13, pp. 71-72; KEEN, 1958, Sea Shells of Tropical West America, p. 528, fig. 49.

Comparison between Berry's good description of his species and Pilsbry's notes on *N. mexicana* indicate general agreement on major characters, with minor differences that appear to be well within the range of individual variation. Pilsbry's notes on species relationships are pertinent and of interest. He says: "A much smaller species than *N. fluxa* Cpr., more elevated, with smaller girdle spines than in young *fluxa* of the same size. The mucro of valve viii is more posterior; in young *fluxa* equal in length to *N. mexicana* the mucro is before the posterior margin of the valve. In *N. thomasi* Pils. the posterior valve is wider with the mucro situated much less posteriorly and the girdle spines are far smaller.

"'*Nuttallina*' *allantophora* and '*N.*' *magdalena* Dall [1919] (Proc. U.S.N. Mus., 55: 502) are quite unlike this species and those previously known from California in sculpture, and indeed their reference to *Nuttallina* appears doubtful. Neither was figured. The presence of 'partly ocular' pustules in the first, and the beaded, *Pallochiton*-like sculpture of the second are certainly strange features for *Nuttallina*!"

Pilsbry's grave doubts that *N. allantophora* Dall and *N. magdalena* Dall are properly allocated to *Nuttallina* are echoed by Dr. Berry, the former being a *species inquirendum* and the latter having now been transferred to *Chaetopleura* (Keen, 1958: 524).

According to Pilsbry, *N. mexicana* was collected by Lowe at Guaymas, Mexico, "on top of rocks in mud flats." A type and paratype were designated, with other paratypes in the Lowe Collection. ANSP no. 243304 consists of two specimens collected by Lowe in January, 1939, at Guaymas and labeled "Type & paratype." The larger of these two specimens agrees with Pilsbry's measurements and is without doubt the intended type specimen of *N. mexicana*. The smaller specimen is partially disarticulated and represents a paratype. The other intended paratypes are two specimens in the Lowe Collection at San Diego, and are in the collection of the San Diego Society of Natural History. The type lot of *Nuttallina crossota* was collected

by Dr. Berry on the reef and in tide pools at the west end of the long bight of Punta Peñasco, Sonora.

Based on specimens that have been seen by the writer so far, this species is fairly common on both sides of the upper end of the Gulf of California, particularly at Punta Peñasco and at San Felipe, Baja California. On the peninsula side it ranges at least as far south as La Paz, specimens having been collected in Los Angeles Bay by Mrs. Faye Howard, and a single one taken at Puerto Ballandra Bay, north of La Paz, by the writer. On the mainland side of the Gulf the southernmost available collecting record is at Guaymas, Sonora, with specimens taken by Lowe at Puerto Libertad near Cabo Lobos. It should be noted that Lowe collected a single specimen on West San Benito Island in 1932 (SDNH no. 23685).

*Chaetopleura (Pallochiton) euryplax* Berry

(Plate 8, figure 2.)

*Chaetopleura raripustulosa* Pilsbry, in PILSBRY and LOWE, 1932, Proc. Acad. Sci. Philadelphia, vol. 84, p. 129. [*A nomen nudum.*] STEINBECK and RICKETTS, Sea of Cortez, 1941, p. 549.

*Chaetopleura (Pallochiton) euryplax* BERRY, 1945. The American Midland Naturalist, vol. 34, no. 2, pp. 491-492, text figs. 1-9 (p. 494); KEEN, 1958, p. 525, figs. 38 a-i.

Unfortunately, Pilsbry's notes do not cover this species. What he must have considered as a holotype and two paratypes are ANSP no. 152129 collected by Lowe at Guaymas in 1930. The label shows an original identification as "*C. lurida* Sowb.," which was later corrected with the pencilled note: "n.s.p. fewer lirae than *lurida* Sowb. *C. raripustulosa* Pils." The Lowe Collection at San Diego contains seven specimens collected by him at Guaymas in January, 1930, and labeled "paratypes" (Lowe no. 8183; SDNH no. 13240).

On the basis of considerable material collected in the Gulf of California recently there seems but little if any doubt that *C. raripustulosa* must fall into the synonymy of *C. euryplax*. Comparison of Dr. Berry's excellent description and figures, not only with the original lot of Pilsbry's material, but also with other specimens from the upper Gulf, both dry and in alcohol, can hardly lead to any other conclusion.

The name "*raripustulosa*" was well chosen by Dr. Pilsbry and it is to be regretted that it can have a status no better than a *nomen nudum*. Compared with *Chaetopleura (Pallochiton) lanuginosa* Carpenter in Dall, 1879, from the Pacific side of Baja California, *C. (P.) euryplax* tends to have fewer pustulate ribs on the tegmentum of all valves and a sparser distribution of the pustules themselves. This sculptural character is quite variable, however, and the elongated teeth of the head valve and other features pointed out by Dr. Berry must be used to differentiate between the two geographical

## PLATE 8

- Figure 1. *Nuttallina crossota* Berry. Hypotype, CAS Paleo. Type Coll. No. 12343. Los Angeles Bay, Gulf of California. Faye Howard coll., March 1960. Length (dry), 12.8 mm. P. 82.
- Figure 2. *Chaetopleura (Pallochiton) euryplax* Berry. Hypotypes, CAS Paleo. Type Coll. Nos. 12349-51. San Felipe, Baja California, G D. Hanna and J. Sefton, Jr., colls., 20-22 March 1951. Lengths (in alcohol), left to right, 35.0, 30.9, and 33.4 mm. P. 83.





assemblages. Color is not a criterion as this is also variable. It ranges from blackish to lighter brown specimens, such as those seen from Guaymas and Tiburon Island, to the fine, large specimens from San Felipe that run lighter in color with occasional white flammulations on the valves, or light greenish-brown with darker markings or sometimes with a pinkish band along the jugum. Dredged specimens from Conception Bay are smaller and generally redder, sometimes with reddish or yellowish-white bands on the jugal area or completely rose-red over all. It should be noted, however, that in all but one of the considerable number of Baja California pallochitons studied, the vertical white markings extending down the posterior slope of the tail valve are present (Pilsbry, 1893, 14: 258).

The present known distribution of *C. euryplax* may be inferred from table 1 which gives a list of material available for study:

TABLE 1  
List of collections of  
*Chaetopleura euryplax* available for study

Locality	Collector & Date	Coll. no.	No. of Spec.	Pres.
Sonora, Mexico (Gulf of California, east side)				
Guaymas	Lowe, 1930	ANSP 152129	3	Dry
Guaymas	Lowe, 1930	SDNH 13240	7	Dry
N. end, Tiburon Id.	Lowe, 1932	SDNH 23652	4	Dry
Baja California (Gulf of California, west side)				
San Felipe (1)	Lowe, 1933	SDNH 23649	12	Dry
San Felipe (2)	G D. Hanna, 1951	CAS 33281	16	Alc.
San Felipe (3)	Faye Howard, 1959-60	Howard	11	Dry
San Luis Gonzaga Bay	Faye Howard, 1960	Howard	1	Dry
Conception Bay, 17 fms.	Lowe, 1932	SDNH 23648	9	Dry

The type lot comes from Adair Bay, north of Punta Peñasco. The slit formula for the type lot of *C. euryplax* is given by Dr. Berry as 8-10: 1: 7-8. A slit count in several disarticulated specimens from the above lots indicates even more variability in the number of slits in the end valves, the formula ranging between 7: 1: 10 in a Conception Bay specimen and 8: 1: 8 in one from Tiburon Island. An 8: 1: 9 formula seems to be the most frequent. This compares with a slit formula for *C. lanuginosa* given by Pilsbry as 8-9: 1: 10-11. The relationship between *C. euryplax* from the upper end of the Gulf of California and *C. lanuginosa* from the Pacific side of the Baja California peninsula is close. There appear to be constant differences, however, between the two faunal assemblages, one being the brownish markings on the insides of

the valves of *C. euryplax*, a feature not observed in the valves of *C. lanuginosa*. Should this be borne out from an examination of more material than is now available, valid grounds can probably be established to warrant reducing *C. euryplax* to the rank of a subspecies of *C. lanuginosa*.

It seems proper to note that no true Pallochitons have yet been seen or reported from Magdalena Bay south to Cape San Lucas on the Pacific side, and from there up into the lower end of the Gulf as far north as Guaymas, a distance roughly of 400-450 coast-line miles. Additional careful collecting could quite possibly fill this range gap. Of interest in this connection are four specimens in alcohol collected at 30 fathoms in the Gulf of Fonseca, El Salvador, by Mr. E. J. Purcell of Tucson, Arizona, in November, 1960, which have a remarkably close resemblance to *C. euryplax*. The principal difference appears to be in the configuration of the tail valve, which in *C. euryplax* is flattened, with the mucro nearly terminal, whereas in the specimens from El Salvador the mucro is slightly anterior to the center of the tegmentum area, with the posterior portion of the valve sloping sharply downward before flattening out to a less thickened posterior margin. In a partially disarticulated specimen, with a slit formula of 10: 1: 12, the teeth in the tail valve are much less thickened, sharper, and the slits are less obliquely cut than in the tail valve of *C. euryplax*; the internal semicircular ridge of callus also is proportionally less thickened. Whether these differences are constant and point to the existence of a geographical race of *C. euryplax* well south of its present known range can be left only to further study of more specimens from the general area than are now available.

*Ischnochiton colimensis* A. G. Smith, new species.

(Plate 9, figure 1.)

*Ischnochiton lowei* Pilsbry, in PILSBRY and LOWE, 1932, Proc. Acad. Nat. Sci. Philadelphia, vol. 84, p. 129. [*A nomen nudum.*]

The third of Pilsbry's undescribed species does not appear to have been reported upon subsequently. It is represented by a complete adult specimen, considered to be the holotype, and a disarticulated one including all eight valves and portions of the girdle, selected as a paratype (ANSP no. 152139). Although Pilsbry's notes on this lot state that paratypes of his *I. lowei* are in the Lowe Collection, these or anything like them have not been found. The original lot was collected at extreme low tide under stones at Manzanillo, Colima, Mexico. The species was stated to be rare.

The following diagnosis is based partly on the complete holotype and partly on the disarticulated paratype:

General appearance similar to *Lepidozona clathrata* (Reeve) from which it differs by having fewer radial ribs on the head and tail valves (12-13, many of them twinned); these ribs, as well as those on the lateral areas are irregularly but not as distinctly tuberculate as they are in *L. clathrata* and



(in the paratype) are decorated with occasional, small, low rounded pustules which may represent a juvenile sculptural character that is lost with age and wear. The posterior borders of valves i to vii are very finely denticulate compared with the coarse denticulation in *L. clathrata*. The central areas show the usual latticed sculpture; the riblets of valve ii diverge slightly at the jugum but are generally parallel on subsequent valves, becoming wider spaced toward the sides and diverging forward, as usual in *Lepidozona*. There is no marked jugal area. The mucro of valve viii is low and slightly forward of the center of the tegmental area. Slit formula (of the paratype): 10: 1: 10; teeth not deeply cut. Insertion plates blunt, beveled on the end valves; eaves not appreciably overhanging, not spongy in structure. Sutural laminae sharp and shaped much as in *L. clathrata* but the jugal plate is relatively smooth and not notched at the sides nor denticulate across the sinus. Girdle normal, covered with usual overlapping scales, which are one-third smaller than those of *L. clathrata*, convex, very finely striate, and generally arranged in an oblique, forwardly-descending rather than longitudinal series.

Color of the dorsal area cinnamon, shading on the sides and ends into a dull brown, the girdle cinnamon tessellated with eight dull olivaceous spots on each side. Interior of valves whitish, with small bluegreen stains along the posterior edges and near the beaks.

Length (dry) of holotype, 24.5; width, 14.3 mm.

*Ischnochiton colimensis* can be separated easily from *L. clathrata* by the smaller, diagonally arranged girdle scales, and by the more cleanly cut sculpture of the dorsal surface of the valves, including the somewhat fewer ribs on the end valves and the lack of any strong pectination on the posterior edges of valves i to vii. Although comparison of *I. colimensis* has been made with a well-known common Baja California *Lepidozona*, to which it is sculpturally quite close, the lack of fine pectination along the jugal plate of the paratype, as well as the absence of notches at the ends of this plate argue for retaining the species in the genus *Ischnochiton* until more specimens can be examined for this feature, which is believed to have generic significance.

*Acanthochitona tabogensis* A. G. Smith, new species.

(Plate 9, figure 2.)

*Acanthochitona panamensis* Pilsbry, in PILSBRY and LOWE, 1932, Proc. Acad. Nat. Sci. Philadelphia, vol. 84, p. 130. [A nomen nudum.]

Valves rather depressed, rounded, not carinate, the side-slopes slightly convex. Jugal areas of intermediate valves sharply defined, more diverging anteriorly on valves ii and iii and less so on valves iv to viii, marked by extremely fine, closely spaced growth striae and by what appear to be fine longitudinal lines that are not incised but are actually part of the color pattern. Latero-pleural areas of intermediate valves covered with small, slightly

ovate, low, closely spaced, concave-topped granules arranged in longitudinal rows generally parallel with the margins of the jugal areas. Head and tail valves with similar granules not arranged in any particular order. Mucro of tail valve projecting and situated a little behind the middle. The insertion plate of the head valve is narrowly grooved dorsally and is nearly half as long as the tegmentum area, with four dark bluish spots at the centers of each tooth back of their margins, a feature not occurring in Pilsbry's juvenile specimen. The tail valve has a tegmentum slightly wider than long, the outlines rounded in front, with a short, straight jugal margin and a nearly semi-circular sinus; behind, the insertion plate is roughened outside, rather thick, with a straight terminal outline. Slit formula, 5: 1: 2.

Color of the dorsal areas generally blackish-brown over all, with a few lighter beige-colored granules bordering the jugal areas and elsewhere on some of the valves of the adult paratype; ventral sides dark bluish-green. In Pilsbry's juvenile specimen the insertion plates and sutural laminae are tinged with red-brown dorsally and are light bluish-green ventrally.

The broad girdle is covered with generally dark-colored, minute, closely-set, short spicules, with sutural rosettes of long, glassy, grayish-green spines; fringing spicules are bluish, especially when viewed from below.

Length of holotype, 28.5; width, 16.4 mm. Holotype and two paratypes, preserved dry, collected in 1931 at Taboga Island, Republic of Panama, by H. N. Lowe (SDNH no. 23668).

The type selected by Pilsbry for his *A. panamensis* (here designated as a paratype of *A. tabogensis*) is a partly disarticulated immature specimen about 15 mm. long, registered as ANSP no. 153556, which he collected during the Pinchot Expedition at Taboga Island, Panama, 31 May 1929. The lot collected by Lowe includes two adult specimens and one juvenile, which show the characters of both adult and immature stages. For this reason they are selected as the type lot, the adult paratype having been partially disarticulated for the purpose of the preceding diagnosis. An additional lot consists of two adult but much worn specimens and was collected by H. N. Lowe at San Juan del Sur, Nicaragua; it is registered as ANSP no. 155314. The species is also stated to have been collected by Lowe in Montijo Bay,

---

PLATE 9

- Figure 1. *Ischnochiton colimensis* A. G. Smith, new species. Holotype, Academy of Natural Sciences of Philadelphia, no. 152139. Manzanillo Colima, Mexico. H. N. Lowe, coll. Length (dry) 24.5 mm. P. 86.
- Figure 2. *Acanthochitona tabogensis* A. G. Smith, new species. Holotype, San Diego Society of Natural History, no. 23666. Taboga Island, Bay of Panama. H. N. Lowe, coll., 1931. Length (dry) 28.5 mm. P. 87